Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims presented in the above-identified application:

Listing of Claims:

1. (currently amended) A system for assaying one or more targets in a sample comprising:

(a) an assay device having one or more assay sets, ~~sets at least one for each target to be assayed, each of~~ the assay sets comprising at least two electrodes, a substrate, and a recognition moiety; the electrodes positioned on the substrate and separated by a gap; the ~~and a~~ recognition moiety ~~immobilized to one or more of the at least two electrodes~~ positioned in the gap and bound to the substrate, the recognition moiety being capable of specific binding to a component of ~~one of the targets~~ a target selected from the group consisting of a bacterium, a virus, and a cell;

(b) an electric or electronic module arranged and configured to measure electric conductance between the at least two electrodes of each assay set;

(c) reagents formulated to deposit a conductive substance onto a complex formed between said recognition moiety and said target, wherein the reagents comprise: (i) a solution comprising nucleation-center forming entities for binding to components of said target if said target is present in the sample; and (ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance on said entities, and wherein the

conductive substance, when deposited onto the complex, forms a conductive bridge between the at least two of the electrodes of a set; and

(d) ~~means~~ microelectronics for determining whether the one or more targets are in the sample as a result of the extent of electric conductance between the at least two electrodes of each assay set.

2. (canceled)

3. (previously presented) A system according to Claim 1, wherein said reagents comprise:

(i) one or more reagents to allow deposition and/or formation of said nucleation center-forming entities on a complex formed between said recognition moiety and said target; and

(ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance from said entities.

4. (previously presented) A system according to Claim 1, wherein said nucleation-center forming entities are colloid particles.

5. (previously presented) A system according to Claim l, wherein said nucleation-center forming entities are metal complexes, clusters, or complexes and clusters.

6. (original) A system according to Claim 4, wherein said colloid particles are colloid gold particles.

7. (previously presented) A system according to Claim 5, wherein said metal complexes or clusters are gold complexes or gold clusters.

8. (original) A system according to Claim 4, wherein said colloid particles are colloid platinum particles.

9. (previously presented) A system according to Claim 5, wherein said metal complexes or clusters are platinum complexes or platinum clusters.

10.-17. (canceled)

18. (previously presented) A system according to Claim 1, comprising a plurality of assay sets of electrodes.

19. (currently amended) A system according to Claim 18, wherein all assay sets of electrodes are for assaying ~~same components~~ the same component of the same target.

20. (original) A system according to Claim 18, wherein different assay sets of electrodes or different groups of assay sets are for assaying different targets.

21. (canceled)

22. (previously presented) A system according to Claim 1, when the target is a protein or polypeptide and the recognition moiety is a protein-binding molecule which specifically binds to the target protein.

23. (original.) A system according to Claim 22, wherein said recognition moiety is an antibody or antibody fraction comprising at least the antigen-binding domain of the antibody.

24. (currently amended) A method for assaying the presence or absence of one or more biological molecule targets in a sample comprising:

(a) providing an assay device having one or more assay sets, ~~sets at least one for each target to be assayed, each of~~ the assay sets comprising at least two electrodes, a substrate, and a recognition moiety; the electrodes positioned on the substrate and separated by a gap; the ~~and a~~ recognition moiety ~~immobilized to one or more of the at least two electrodes~~ positioned in the gap and bound to the substrate, the recognition moiety being capable of specific binding to ~~one of the targets~~ a target;

(b) contacting said assay device with a sample which may or may not have the target under conditions permitting binding of targets, if any, present in the sample to specific recognition moieties to form a complex;

(c) contacting said assay device with reagents to deposit a conductive substance onto the complex formed between said recognition moiety and said target, such that the conductive substance deposits onto the complex and forms a conductive bridge between said at least two electrodes;

(d) connecting said at least two electrodes to an electric or electronic module to measure conductance between said at least two electrodes; and

(e) determining conductance between said at least two electrodes, wherein conductance above a threshold conductance indicates the presence of

a respective target in the sample while conductance below a threshold conductance indicates the absence of any targets in the sample.

25. (currently amended) A method for assaying the presence or absence of one or more biological molecule targets in a sample comprising;

(a) reacting a sample which may or may not have targets with a first reagent solution to bind nucleation center-forming entities to said targets;

(b) providing an assay device having one or more assay sets, ~~sets at least one for each target to be assayed, each of~~ the assay sets comprising at least two electrodes, a substrate, and a recognition moiety; the electrodes positioned on the substrate and separated by a gap; the ~~and a~~ recognition moiety ~~immobilized to one or more of the at least two electrodes~~ positioned in the gap and bound to the substrate, the recognition moiety being capable of specific binding to ~~one of the targets~~ a target;

(c) contacting said assay device with said sample which may or may not have the target under conditions permitting binding of targets, if any, present in the sample to specific recognition moieties;

(d) contacting said device with a second reagent solution to form a conducting metal substance over said nucleation center-forming entities for a time sufficient to yield a conductive bridge between said at least two electrodes;

(e) connecting said at least two electrodes to an electric or electronic module to measure conductance between said at least two electrodes; and

(f) determining conductance between said at least two electrodes, wherein conductance above a threshold conductance indicates the presence of

a respective target in the sample while conductance below a threshold conductance indicates the absence of any targets in the sample.

26. (currently amended) A method for assaying the presence or absence of one or more biological molecule targets in a sample comprising:

(a) providing an assay device having one or more assay sets, ~~sets at least one for each target to be assayed, each of~~ the assay sets comprising at least two electrodes, a substrate, and a recognition moiety; the electrodes positioned on the substrate and separated by a gap; the ~~and a~~ recognition moiety ~~immobilized to one or more of the at least two electrodes~~ positioned in the gap and bound to the substrate, the recognition moiety being capable of specific binding to ~~one of the targets~~ a target;

(b) contacting said assay device with a sample which may or may not have the target under conditions permitting binding of targets, if any, present in the sample to specific recognition moieties;

(c) contacting said device with a first reagent solution comprising monomers of a conductive polymer such that said monomers can bind to complexes formed between the targets and recognition moieties;

(d) treating said device such that said monomers will polymerize to form a conducting polymer, such that upon polymerization of the monomers a conductive bridge between the at least two electrodes of at least one set is formed; and

(e) determining a conductance between said at least two electrodes, wherein conductance above a threshold conductance indicates the presence of a respective target in the sample while conductance below a threshold conductance indicates the absence of any targets in the sample.

27. (previously presented) A method according to Claim 26, comprising before step (a) reacting the sample with a second reagent solution containing entities which can form nucleation centers for growing therefrom a conductive polymer from said monomers, such that said entities bind to said targets if present in the sample.

28. (previously presented) A method according to Claim 26, comprising after step (a) contacting said assay device with a second reagent solution containing entities which can form nucleation centers for growing therefrom a conductive polymer from said monomers, such that said entities bind to said targets if bound to said recognition moieties.

29. (previously presented) A method according to Claim 24, wherein said targets are nucleic acid molecules and the recognition moieties are oligonucleotides, each of which has a sequence which is complementary to a nucleic acid molecule of said target.

30.-34. (canceled)

35. (currently amended) An electronic device for determining the presence or absence of one or more targets in a sample comprising:

an integrated circuit comprising a first group of N_1 conductors and a second group of N_2 conductors, defining between them N_1xN_2 junctions, each such junction being formed with an electronic module comprising two electrodes, each ~~one~~ electrode linked to or defined as an integral portion of

one of the conductors and supported by a common substrate, ~~and~~ the circuit further comprises a diode or non-linear component permitting current flow through the electronic module only in the direction from the first group of conductors to the second group of conductors whereby a current flowing between one conductor of the first group to one conductor of the second group of conductors defines a single junction point between them; each pair of electrodes forming part of an assay set, each assay set having a recognition moiety for binding to a component of a target selected from the group consisting of a bacterium, a virus, and a cell, the recognition moiety bound to ~~at least one of the electrodes~~ the substrate and positioned between the electrodes; ~~and~~ the assay sets adapted to accept reagents formulated to deposit a conductive substance onto a complex formed between said recognition moiety and said target, wherein said reagents comprise: (i) a solution comprising nucleation-center forming entities for binding to components of said target if said target is present in the sample; and (ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance on said entities; and means for determining whether the one or more targets are in the sample as a result of the extent of electric conductance between the two electrodes of each assay set.

36. (previously presented) A device according to Claim 35, wherein distance of center of one assay set to a center of an adjacent assay set is 100 μm or less.

37. (previously presented) An electric device for determining the presence or absence of one or more targets in a sample comprising:

a microelectronic device having a plurality of layers, with a first group of conductors being defined as stripes in one or more first layers and a second group of conductors being defined as stripes in one or more second layers of the device with each of said second layers being separated from a first layer by a non-conductive substance, electrodes of the device being formed as open ends of the conductors by openings or cut-outs in a vertical direction through the layers;

each pair of electrodes forming part of an assay set, each assay set having a recognition moiety for binding to a component of a target selected from the group consisting of a bacterium, a virus, and a cell bound to ~~at least one of the electrodes~~ one or more layer in the vertical opening or cut-out; ~~and~~ wherein the assay sets are adapted to accept reagents formulated to deposit a conductive substance onto a complex formed between said recognition moiety and said target, wherein said reagents comprise: (i) a solution comprising nucleation-center forming entities for binding to components of said target if said target is present in the sample; and (ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance on said entities, and

~~means~~ microelectronics for determining whether the one or more targets are in the sample as a result of the extent of electric conductance between the pair of electrodes off each assay set.

38. (previously presented) A system according to Claim 18, wherein the device is an electronic device for determining one or more targets in a sample, comprising:

an integrated circuit comprising the first group of N_1 conductors and a second group of N_2 conductors, defining between them the N_1xN_2 junctions, each such junction being formed with an electronic module comprising two electrodes, each one linked to or defined as an integral portion of one of the conductors, and comprises a diode or non-linear component permitting current flow through the electronic module only in the direction from the first group of conductors to the second group of conductors, whereby a current flowing between one conductor of the first group to the one conductor of the second group of conductors defines a single junction point between them; each pair of electrodes forming part of an array set, each array set having a recognition moiety bound to at least one of the electrodes.

39. (currently amended) A method according to Claim 24, wherein said device is an electronic device for determining one or more targets in a sample, comprising:

an integrated circuit comprising the first group of N_1 conductors and a second group of N_2 conductors, defining between them N_1xN_2 junctions, each such junction being formed with an electronic module comprising two electrodes, each ~~one~~ electrode linked to or defined as an integral portion of one of the conductors and supported by a common substrate, ~~and~~ the circuit further comprises a diode or non-linear component permitting current flow through the electronic module only in the direction from the first group of conductors to the second group of conductors, whereby a current flowing between one conductor of the first group to one conductor of the second group of conductors defines a single junction point between them; each pair of electrodes forming part of an array set, each array set having a recognition

moiety bound to ~~at least one of the electrodes~~ the substrate and positioned between the electrodes.

40. (canceled)

41. (previously presented) A method for detecting the presence or absence of one or more targets in a sample by multiplexing comprising:

(i) contacting the electronic device of Claim 35 with a sample which may or may not have the target under conditions enabling binding of the targets, if any, present in the sample to recognition moieties; and

(ii) determining conductance in each assay set.

42. (canceled)

43. (previously presented) A system according to Claim 1, wherein said one or more targets are one or more nucleic acid sequences.

44. (previously presented) A system according to Claim 43, wherein said recognition moiety is an oligonucleotide having a sequence complementary to at least a portion of sequence of one of said one or more targets.

45. (previously presented) A method according to claim 24, further comprising contacting said assay device with a first reagent solution to form nucleation-center forming entities for depositing onto or binding to complexes formed between a target and a recognition moiety.

46. (canceled)

47. (previously presented) A method according to Claim 25, wherein said targets are nucleic acid molecules and the recognition moieties are oligonucleotides, each of which has a sequence which is complementary to a nucleic acid molecule of said target.

48. (previously presented) A method according to Claim 26, wherein said targets are nucleic acid molecules and the recognition moieties are oligonucleotides, each of which has a sequence which is complementary to a nucleic acid molecule of said target.

49. (previously presented) A method according to Claim 24, wherein said targets are selected from the group consisting of a bacterium component, a virus component, and a cell component.

50. (previously presented) A method according to Claim 25, wherein said targets are selected from the group consisting of a bacterium component, a virus component, and a cell component.

51. (previously presented) A method according to Claim 26, wherein said targets are selected from the group consisting of a bacterium component, a virus component, and a cell component.

52. (canceled)

53. (previously presented) An electronic device according to Claim 35, wherein said recognition moiety is a nucleic acid molecule.

54. (previously presented) An electric device according to Claim 37, wherein said recognition moiety is a nucleic acid molecule.

55. (previously presented) A system according to Claim 1, wherein said means comprises a computer.

56. (previously presented) A system according to Claim 1, wherein said means comprises a scanner for analyzing a plurality of assay sets.

57. (previously presented) A system according to Claim 1, further comprising a sample which may or may not have the target.

58. (previously presented) A system according to Claim 18, wherein said means comprises a computer.

59. (previously presented) A system according to Claim 18, wherein said means comprises a scanner for analyzing a plurality of assay sets.

60. (previously presented) An electronic device according to Claim 35, wherein said means comprises a computer.

61. (previously presented) An electronic device according to Claim 35, wherein said means comprises a scanner for analyzing a plurality of assay sets.

62. (previously presented) An electric device according to Claim 37, wherein said means comprises a computer.

63. (previously presented) An electric device according to Claim 37, wherein said means comprises a scanner for analyzing a plurality of assay sets.

64. (new) A system for assaying one or more targets in a sample comprising:

(a) an assay device having one or more assay sets, the assay sets comprising at least two electrodes and a recognition moiety immobilized to one of the electrodes, the recognition moiety being capable of specific binding to a component of a target selected from the group consisting of a bacterium, a virus, and a cell;

(b) an electric or electronic module arranged and configured to measure electric conductance between the at least two electrodes of each assay set;

(c) reagents formulated to deposit a conductive substance onto a complex formed between said recognition moiety and said target, wherein the reagents comprise: (i) a solution comprising nucleation-center forming entities for binding to components of said target if said target is present in the sample; and (ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance on said entities, and wherein the conductive substance, when deposited onto the complex, forms a conductive bridge between the at least two of the electrodes of a set; and

(d) microelectronics for determining whether the one or more targets are in the sample as a result of the extent of electric conductance between the at least two electrodes of each assay set.

65. (new) A system for assaying one or more targets in a sample comprising:

(a) an assay device having one or more assay sets, the assay sets comprising at least two electrodes and a recognition moiety immobilized to each of the electrodes, each recognition moiety being an antibody capable of specific binding to an epitope of a target selected from the group consisting of a bacterium, a virus, and a cell;

(b) an electric or electronic module arranged and configured to measure electric conductance between the at least two electrodes of each assay set;

(c) reagents formulated to deposit a conductive substance onto a complex formed between said recognition moiety and said target, wherein the reagents comprise: (i) a solution comprising nucleation-center forming entities for binding to components of said target if said target is present in the sample; and (ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance on said entities, and wherein the conductive substance, when deposited onto the complex, forms a conductive bridge between the at least two of the electrodes of a set; and

(d) microelectronics for determining whether the one or more targets are in the sample as a result of the extent of electric conductance between the at least two electrodes of each assay set.

66. (new) A system for assaying one or more targets in a sample comprising:

(a) an assay device having one or more assay sets, the assay sets comprising at least two electrodes and a recognition moiety immobilized to each of the electrodes, each recognition moiety being a long oligonucleotide that is capable of specific binding to a short oligonucleotide such that the short oligonucleotide can link at least two of the recognition elements, the short oligonucleotide comprising a sequence of a nucleic acid from a target in the group consisting of a bacterium, a virus, and a cell, wherein the specific binding includes the sequence;

(b) an electric or electronic module arranged and configured to measure electric conductance between the at least two electrodes of each assay set;

(c) reagents formulated to deposit a conductive substance onto a complex formed between said recognition moiety and said target, wherein the reagents comprise: (i) a solution comprising nucleation-center forming entities for binding to components of said target if said target is present in the sample; and (ii) a combination of metal ions and a reducing agent to allow formation of said conductive substance on said entities, and wherein the conductive substance, when deposited onto the complex, forms a conductive bridge between the at least two of the electrodes of a set; and

(d) microelectronics for determining whether the one or more targets are in the sample as a result of the extent of electric conductance between the at least two electrodes of each assay set.